USAWC STRATEGY RESEARCH PROJECT

NATIONAL MISSILE DEFENSE - A POST 9/11 IMPERATIVE

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ABSTRACT

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The events of September 11, 2001 (9/11) significantly altered the American people's perspective regarding all aspects of a homeland defense strategy. The outcome of this tragic attack demonstrated that the rules have changed and that our adversaries have the will and capability to strike American interests within our borders. Perhaps more relevant, it also exposed that if existing homeland defense vulnerabilities are not appropriately addressed, they will eventually be exploited.

The purpose of this paper is to explore the future of National Missile Defense (NMD) as a post 9/11 imperative to a comprehensive homeland defense strategy. It will initially examine NMD policy objectives and its implications to the strategic environment. Examination of the current and future missile threat is offered next, followed by presentation of the Bush administration's layered NMD employment concept and future development strategy. A feasibility assessment of the Bush administration's NMD concept is then considered based on the factors of cost and technological readiness.

The author will contend that if it is the fundamental responsibility of our government to provide for the defense of its people, then the decision to withdraw from the Anti-ballistic Missile (ABM) treaty and proactively pursue progressive deployment of a less restricted NMD capability represents coherent and warranted policy. Delaying implementation invites the future exploitation of existing missile defense vulnerabilities. However, our nation must concurrently contend with other clear and present dangers, suggesting prudent limitations to initial NMD options. Complex homeland defense challenges, including the emergence of new and innovative asymmetric threats, will continue to dictate future assessment of our NMD posture.

TABLE OF CONTENTS

ABSTRACT ..... **III**

NATIONAL MISSILE DEFENSE – A POST 9/11 IMPERATIVE **1**

U.S. NMD POLICY **1**

POLICY OBJECIVES 2

RESOURCE ISSUE 3

DIPLOMATIC IMPLICATIONS **5**

ABM TREATY 5

RISKS 6

THE BALLISTIC MISSILE THREAT TO U.S. HOMELAND SECURITY **7**

PROLIFERATION 7

THE RUMSFELD COMMISSION 9

NMD DEVELOPMENT ALTERNATIVES / EMPLOYMENT STRATEGY **10**

CONCEPT 10

TERMINAL PHASE DEFENSE 12

MIDCOURSE PHASE DEFENSE 13

BOOST PHASE DEFENSE 14

U.S. NMD POLICY FEASIBILITY **15**

ASSESSMENT 15

COST 15

TECHNOLOGY 17

INITIAL NMD EMPLOYMENT PROPOSAL **17**

CONCLUSION **20**

ENDNOTES **23**

GLOSSARY **29**

BIBLIOGRAPHY **31**

NATIONAL MISSILE DEFENSE – A POST 9/11 IMPERATIVE

> While past threats came from other states and were primarily aimed at U.S. forces or allies overseas, new challenges such as the *proliferation of missiles and weapons of mass destruction*, terrorism, and attacks on our information infrastructure may well involve *non-state actors* and will *directly affect security at home.* [1]
>
> —Anthony Cordesman
> Center for Strategic and
> International Studies

The events of September 11, 2001 (9/11) confirmed to the American people in tragic and graphic detail, that the United States is no longer immune to attacks against American interests within its borders. The catastrophic outcome demonstrated the need to examine and assess a wide range of existing security vulnerabilities. The U.S. Government is faced with the challenge of exploring the viability of new and potential threats, developing or reshaping existing policies accordingly, while contending with the need to balance finite resources required to address other clear and present dangers to global security.

The purpose of this research and analysis is to explore the ballistic missile threat to the U.S. homeland, and its impact on U.S. National Missile Defense (NMD) policy. Specifically, the objectives are to present and examine:

- U.S. NMD policy objectives;
- Diplomatic implications of U.S. NMD policy;
- The ballistic missile threat relative to U.S. homeland defense;
- NMD development / employment strategy;
- Feasibility U.S. NMD policy.

The paper will conclude by providing a recommended future U.S. NMD employment policy and posture.

U.S. NMD POLICY

> It is the policy of the United States to deploy as soon as is technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (whether accidental, unauthorized, or deliberate) with funding subject to the annual authorization of appropriations and the annual appropriation of funds for National Missile Defense.
>
> —The National Missile Defense Act, 106th Congress
> of the United States of America, 6 Jan 1999.

POLICY OBJECIVES

In the year after the devastating attacks of 9/11, the Bush administration has continued to aggressively advocate the position that NMD is an imperative national defense initiative.

> Missile defense, it seems to me, is very reasonable. And what we know is that with the end of the Cold War, proliferation has spread these technologies and weapons of mass destruction around the globe. Any president, looking at his responsibility as commander-in-chief, would have to say that a policy that is designed to keep the American people totally vulnerable does not make much sense.[2]

Secretary Rumsfeld's statement clearly indicates that the objective of U.S. NMD policy is, at a minimum, to provide a ballistic missile defense capability to the 50 states against the potential of missile attack sponsored or conducted by a rogue state such as North Korea or Iraq. The Quadrennial Defense Review (QDR) Report correctly recognizes that the geographic protection afforded the U.S. throughout history has been further diminished since the end of the Cold War with the advances and proliferation of emerging technologies. "As September 2001 events have horrifically demonstrated, the geographic position of the United States no longer guarantees immunity from direct attack on its population, territory, and infrastructure…the United States and its overseas forces were vulnerable to Soviet missiles during the Cold War, it is clear that over time an increasing number of states will acquire ballistic missiles with steadily increasing effective ranges."[3]

The National Security Strategy of the United States indicates the need for a NMD system that will effectively defend against potential missile attack from rogue states and organizations that, though unable to compete with the overwhelming conventional superiority of the United States, possess the capacity to attack U.S. missile defense vulnerabilities without indication. President Bush clearly confirmed this as a leading objective of U.S. NMD policy during a commencement address at West Point in June of 2002, stating,

> The gravest danger to freedom lies at the crossroads of radicalism and technology. When the spread of chemical and biological and nuclear weapons, along with *ballistic missile technology*—when that occurs, even weak states and small groups could attain a catastrophic power to strike great nations. Our enemies have declared this very intention, and have been caught seeking these terrible weapons. They want the capability to blackmail us, or harm us, or to harm our friends—and we will oppose them with all our power.[4]

The use of asymmetric means to counter U.S. "strength and influence in the world," including the "potential use of weapons of mass destruction (WMD), that can be easily concealed, delivered covertly, and used without warning"[5] presents a new concept to the definition of imminent threat. The National Security Strategy of the United States of America

recognizes the need for adaptation to the objectives and capabilities of emerging 21st century threats, stating, "Traditional concepts of deterrence will not work against a terrorist enemy whose avowed tactics are wanton destruction and the targeting of innocents…those that pursue WMD compels us to action."[6] Response to adversaries who "openly and actively seek the world's most destructive technologies"[7] has set conditions for policy that is now anticipatory by nature. "As a matter of common sense and self defense, America will act against emerging threats before they are full formed,"[8] and "to forestall or prevent such hostile acts by our adversaries, the United States will, if necessary, act preemptively."[9] These statements clearly reveal the administration's view concerning the dangers and risk of inaction. This view is echoed in the National Strategy for Homeland Defense concerning risk based on probability of attack as follows: "If our terrorist enemies acquire these weapons and the *means to deliver them* they are likely to try to use them, with potential consequences far more devastating than those we suffered on September 11."[10]

In concert with the fundamental changes to the strategic environment and emerging threats to U.S. interests both globally and at home, the QDR establishes a U.S. defense strategy endorsing a shift from a threat-based to a capabilities-based model. The fundamental concept of the capability-based approach "reflects the fact that the United States cannot know with confidence what nation, combination of nations, or non-state actor will pose threats to vital U.S. interests or those of U.S. allies and friends decades from now."[11] The rationale for employing a capabilities-based approach can be examined by contrasting the threat-based approach of the Cold War era with the current strategic environment. During the Cold War era threat-based capabilities, which concentrated efforts on *who*, our adversary was, *where* the conflict would occur, and emphasized defeating or deterring a *well defined* adversary. The current strategic environment "requires identifying capabilities that U.S. military forces will need to deter and defeat adversaries who will rely on surprise, deception, and asymmetric warfare to achieve their objectives."[12] The capability to defend against a rapidly increasing ballistic missile threat is consistent with this strategy, and though limited means exists, currently represents a glaring vulnerability in U.S. defensive capabilities.

RESOURCE ISSUE

Despite the powerful rationale for NMD, cost (estimated at $54 billion for the full Capability 3 system, the objective system favored by the Clinton administration, which has already exceeded Congressional Budget Office projections by $8 billion), and technological lifecycle planning have raised concerns about locking into technology that could soon be obsolete and

exploited by advances in threat missile technology. "By choosing to deploy as soon as possible, the United States would, to a considerable extent, be locking itself in to a missile defense system based on today's technology."[13] Concern has also been raised regarding the cost / benefit ratio in view of the presumed improbability of proposed threat scenarios.

Although the results of eleven tests of various types of missile defense systems in the past two years have yielded ten successful intercepts, and one proximity intercept,[14] technical readiness and cost remains a topic of serious debate. This concern is shared by politicians who point to the potential costs associated with upgrades required to remain ahead of the pace of threat technology, and the requirement for continued research, development, and testing. Such requirements could entail considerably greater funding than current projections.

The competing demand for resources required to address other emerging vital homeland security initiatives has increased budget concerns and raised valid deliberations. Threats to U.S. population centers, transportation systems, economic and information systems, as well as bio-terrorism, all represent areas of critical concern. Finite resources require a cost benefit analysis based on the need "to achieve a reduction in both the risk of future terrorist events and their consequences should an attack occur."[15] The substantial cost of NMD employment must be measured and balanced against its value to the overall homeland security strategy. Senator Carl Levin stressed the need to carefully examine both the *capability and probability* of the threat when planning U.S. policy stating, "...we must examine and prioritize the threats to our national interests. This includes looking at the whole spectrum of threats, emerging and traditional, and determining what actions are necessary to counter them, and what force structure is required to meet them."[16]

The Department of Defense (DoD), addresses this concern in the QDR, identifying missile defense capability as an essential element of future U.S. defense strategy, one that establishes conditions that allows freedom of action in anti-access and area-denial environments. "DoD must be prepared to provide near-term capabilities to defend against rapidly emerging threats and more robust capabilities that evolve over time."[17] In relation to the demand for resources, the challenge faced by DoD is the ability to appropriately balance both present and future spectrum of threats, as well as competing national security priorities.

The QDR establishes a broad risk management framework to assess and consider four dimensions of the current and future defense posture as it relates to the strategic environment: force management, operational, future challenges, and institutional practices.[18] The purpose of the framework is a simple one; establish a strategy to address present and future requirements that provides a means to mitigate the risk to the operational force, key-enabling capabilities, as

well as to the supporting structure. "Because resources are always finite, hard choices must be made that take into account a wider range of risks than was necessary in the past."[19] NMD policy goals and strategic tenets are clearly relevant to two of the four dimensions considered in the apportionment of resources: operational and future challenges. The relevance and prioritization of commitment to research, development, and testing efforts is clearly established especially when considering U.S. vulnerabilities to emerging asymmetric threats that include the increased proliferation of ballistic missiles. The potential to employ and associate chemical, biological, radiological, nuclear, and enhanced high explosive (CBRNE) capabilities with ballistic missile delivery means represents an even greater risk. The position can be made that an *increased threat capability*, in conjunction with a *clearly identifiable vulnerability;* establishes a correlation to an *increased probability* of future ballistic missile attacks directed against interests within U.S. borders.

DIPLOMATIC IMPLICATIONS

ABM TREATY

The end of the Cold War era brought with it the prospect of pursuing new treaty and missile defense policy options with Russia, options that were previously unattainable with the Soviet Union.[20] During the Cold War a policy of deterrence with a peer competitor was achieved by the threat of mutual assured destruction (MAD), and stability based largely by the effect of the1972 Anti-Ballistic Missile (ABM) treaty, and the Strategic Arms Limitation Talks (SALT I) which were designed with "respect to the limitation of strategic offensive arms and the creation of more favorable conditions for active negotiations on limiting strategic arms as well as to the relaxation of international tension and the strengthening of trust between States."[21] However, this interpretation alone lacks full substance to the complete circumstances. Analysis of the ABM treaty must, also consider that, though the goal of decreased escalation of *offensive* nuclear capabilities was a primary intention, the ABM treaty also served to radically delimit the progression of *defensive* systems. The effect of this aspect of the ABM treaty presents another perspective worth consideration. The ABM treaty served to prevent deployment of systems designed to destroy incoming ballistic missiles, and as a result, it controlled the other side by not upsetting the "hostage" scenario that it established. The MAD scenario would not work if one side could avoid being destroyed by applying effective defensive measures.[22] Setting conditions in which vulnerability to offensive nuclear capability exists without adequate defensive counter measures eventually led to increased covert proliferation. These conditions served to foster the desire of "have-not" states to obtain a nuclear weapons capability for

purposes of international influence, security, and leverage against perceived in-balance of power.

The Bush administration decision to unilaterally withdraw from the 1972 ABM treaty, concluding that, “the ABM treaty hinders our government's ability to develop ways to protect our people from future terrorist or rogue state missile attacks"[23] demonstrates the fundamental commitment to the NMD program. Despite concern over the potential consequences resulting from abandonment of the treaty, including complicating the future of arms control, the possibility of accidental launch (caused by the cessation of mutual inspections), and the potential destabilizing effect on international relations, the Bush administration maintains the position that the ABM treaty had lost its utility. This final point suggests that the ultimate desire of the Bush administration is to obtain a final end state objective that exceeds a limited NMD posture, one capable of responding to homeland defense concerns, and establish a missile defense capability of increased strategic utility. The concept of employing a more strategic NMD system, capable of protecting not only “the territory of the United States against limited ballistic missile attack,” but one with the ability to protect the U.S. homeland, interests abroad, and interests of our friends and allies presents the key difference between the current and past administrations view of NMD from a policy perspective.

RISKS

The effect of unilateral withdrawal from the ABM treaty on the world community should not, however, be understated. When NMD was introduced to the international agenda in 1999, 80 countries supported the United Nations (U.N.) General Assembly resolution protecting the integrity of the ABM treaty.[24] Though much skepticism still exists regarding the ultimate effect on U.S.-Russia relations, the nature of the decision is actually consistent with the U.S. National Security Strategy, released in September 2002 by the Bush administration, which asserts a shift from “confrontation to cooperation”[25] concerning the U.S. post Cold War relationship with Russia. Edwin J. Feulner, president of the Heritage Foundation, optimistically states that, "Even with Putin — a former KGB officer — at the helm, [Russians] view us as strategic partners in the real war of the 21st century: the war on terrorism. The ABM treaty has no place in such a world."[26] Feulner describes the Russian and U.S. ABM strategy as a display of cooperative action against a common threat. Whether the ABM treaty “has no place…” as Feulner suggests, might be a point the Russians would choose to dispute if the conditions of cooperation provided them a better position to challenge.

China presents a different challenge that has led to diplomatic friction in U.S.-China relations regarding the deployment of NMD. Though China possesses a relatively small nuclear capability, fears have arisen that U.S. NMD employment theoretically could serve to support a policy of nuclear blackmail. NMD capabilities are viewed as a threat to the balance of power and would serve to further bolster the U.S. ability to coerce China in regard to issues such as Taiwan.[27]

The development of an active missile defense capability also presents an ideological paradigm shift after decades of deterrence policy. Though recent advancements in technology have given the U.S. the potential to overcome its missile defense vulnerability with a reliable NMD capability, the diplomatic consequences effecting the international security environment expose a double-edged sword. NMD skeptics still question the need to break from a policy of deterrence that has, in their view, proven successful, to a policy geared at defeating a threat of disputed viability. Departure from security transactions and past commitments with other nations, including allies, represent the evolution of the new strategic environment, and will require adroit leadership to avoid negative implications. Venturing to change established measures of proven successful precedent has raised perceptions of potentially jeopardizing balance and stability as a cost associated with NMD objectives. Senator Levin, in opposition, stated "I'd love to have a defense against a North Korean missile if I could have it operationally effective and take away whatever leverage that gets them. But I don't, in that process, want to create a greater danger to ourselves."[28]

THE BALLISTIC MISSILE THREAT TO U.S. HOMELAND SECURITY

PROLIFERATION

The increased proliferation of missile technology raises a concern over defensive vulnerabilities. The propagation of ballistic missile capabilities not only poses a greater potential of attack to the United States, but in theory it also provides a vehicle for states or actors that are reliant on asymmetric means to threaten attack. The threat to U.S. interests from ballistic missiles has grown steadily as the extent of sophisticated technology increases and continues to propagate, especially in vital regions.[29] Consequently, proliferation has provided a limited ability to terrorize and potentially destabilize American global leadership by discouraging advancement of our interests abroad.[30] The threat of rogue states or terrorist organizations obtaining inexpensive nuclear weapons in the future and, through the use of creative delivery options, striking within U.S. boundaries presents a threat against which there currently is no viable continuous or contiguous defense.

The Bush administration revealed in October of 2002, that North Korea has, as suspected, an operating and functional nuclear weapons program. This disclosure of violations was announced just as the Bush administration was aggressively seeking U.N. support of military action in Iraq. The Iraq mandate was once again aimed to force compliance with ignored U.N. resolutions, particularly to those pertaining to disarmament, and Iraq's pursuit of nuclear, chemical, and biological, and associated ballistic missile capabilities. The dilemma faced by the Bush administration in this case provides an example of the expanding threat, and international instability caused by proliferation. Both states, charter members of the President Bush's "axis of evil", present threats in vital regions of the world, and are being addressed using different approaches, military force in Iraq and strong diplomacy in North Korea. The perception of a contradiction in policy has been labeled a double standard by Islamic nations and has been openly questioned by both the U.S. media and in international forums like the U.N. In response, Defense Secretary Donald H. Rumsfeld cautioned against comparing it with Iraq, "Iraq has unique characteristics that distinguish it and that suggest that it has nominated itself for special attention because of the breadth of what they're doing," Mr. Rumsfeld said. Asked whether the United States was contemplating using force against Pyongyang, as it was against Iraq, Secretary of State Colin Powell responded: "We are not planning anything of that nature right now."[31] White House spokesman Scott McClellan stated President Bush was interested in "seeking a peaceful resolution…this is best addressed through diplomatic channels at this point."[32]

However, the modest approach regarding North Korea's violations might also be related to the unattractive prospect that conducting military operations in two separate theaters poses. Iraq based on a long history of violations, geographic circumstances, and announced intent, is clearly perceived by the Bush administration as a threat requiring imposition of military force to resolve. North Korea's violations confirm the U.S. governments worst reservations, and signal that if strong diplomacy fails, subsequent military intervention might eventually be required to prevent further escalation. State Department spokesman Richard Boucher remarked, "North Korea is in serious violation…and we're consulting with others about what the appropriate steps might be for us to take if North Korea does not eliminate this program in a verifiable manner."[33] Perhaps most significantly however is the question of whether policy options would be different if not for a lack of a viable defensive posture to adequately defend against the missile delivery options of these threats.

The relative low cost, quick production, flexibility, and survivability of ballistic missiles offers an emerging "weapon of choice" to states seeking an inexpensive alternative to procuring

and sustaining a large air force. "Since 1980, ballistic missiles have been used in six regional conflicts. Strategic ballistic missiles, including intercontinental and submarine launched ballistic missiles (ICBMs and SLBMs) exist in abundance in the world today."[34] The QDR addresses the proliferation of ballistic missiles and CBRNE weapons as a security trend that will continue to increase in the future strategic environment. The concern over the spread of CBRNE, enhanced and innovative delivery options, rapid growth in biotechnology, and the pace of recent missile proliferations, presents a challenge to one of the few dimensions of armed conflict and defense that the U.S. remains vulnerable.[35]

THE RUMSFELD COMMISSION

The findings of the Rumsfeld Commission, perhaps the most comprehensive study produced regarding the existing and emerging ballistic missile defense threat to the United States, were expressed in three principle conclusions: the missile threat to the United States is real and growing, the threat is greater than previously assessed, and we may have little or no warning of new threats.[36] However, it must also be considered that though there are three dozen countries that possess ballistic missiles, 75% of these have ranges less than 300 miles, and only four countries have the long range capability to strike the United States (Russia, China, Britain, and France).[37] The commission identified Russia, China, North Korea, Iran, Iraq, India, and Pakistan as states demonstrating an objective to acquire ballistic missile technology.[38] The National Military Strategy of the United States currently lists North Korea and Iraq as rogue states, while Russia remains a major exporter of missile technology to nations hostile to the United States.[39] Recent evidence suggests that North Korea is closer to the successful development of the Taepo Dong 2 (TD-2) missile, and "light-weight variations of the TD-2 that could fly as far as 10,000 km, placing at risk western U.S. territory in an arc extending northwest from Phoenix, Arizona, to Madison, Wisconsin. These variants of the TD-2 would require additional time to develop and would likely require an additional flight test."[40]

Iran poses another threat, as it remains actively engaged in the engineering and development of ICBM-type missiles. Iran has been linked as a proxy to long-range testing with and for North Korea. "The upshot question of all of this is whether Iran will in fact flight test the Taep'o-dong-2/Shahab-5, 6 class booster in place of North Korea while also gaining benefit for its own testing program. This is because North Korea cannot afford to do so because of international agreements not to flight test its ballistic missiles."[41] Despite restrictions to North Korea's long –range missile program, U.S. intelligence agencies remain vigilant for activity that

would indicate that North Korea is preparing to conduct a flight test of a ballistic missile capable of impacting within the territory of the United States.[42]

NMD DEVELOPMENT ALTERNATIVES / EMPLOYMENT STRATEGY

CONCEPT

The Bush administration has yet to commit to a specific NMD employment plan. In his speech at the National Defense University in May of 2001, President Bush stated the administration's fundamental intent is to examine "all available technologies and basing modes for effective missile defenses that could protect the United States, our deployed forces, our friends and our allies."[43] His statement does however indicate the administration's intent to aggressively proceed and that development and employment considerations will include a combination of both limited and strategic considerations (exceeding current NMD Act policy objectives). The complementary employment of current and future systems provides the potential of near-term limited gains, leveraging current technology while future development is geared at remaining ahead of the expanding ballistic missile threat.

The identification of an employment concept is however consistent with the administrations NMD strategy. This concept represents a *structured layered approach,* capable of reducing near term vulnerabilities to U.S. territory, population, and infrastructure without delay, while providing the foundation for potential future integration options. The end result of this concept would posture the U.S. with a NMD capability that addresses the full spectrum of the ballistic missile threat, consequently discourage investment in offensive ballistic missile proliferation, and provide the means to achieve global, strategic, influence to U.S. national interests.

Under the direction of the Secretary of Defense, Missile Defense Agency (MDA), research, development and test programs will focus on missile defense as a single integrated Ballistic Missile Defense (BMD) system that no longer differentiates between theater and national missile defense.[44] The change in development strategy is significant from the approach taken by the previous administration and is based on three basic tenets. First, the new development program will leverage the gains in previous technical progress and continue to provide funding required to adequately develop and test selective elements of existing program initiatives. Next, the new program will aggressively evaluate and develop technologies for the integration of land, sea, air, or space-based platforms to counter ballistic missiles in all phases of flight, and to pursue parallel development paths to improve the likelihood of achieving an effective, layered missile defense. Finally, the new testing program will be conducted in a more

thorough and robust manner, with a greater variety of realistic threat scenarios and countermeasures. This approach is designed to promote acceleration of selected elements of the program based on performance and enable contingency use of the demonstrated BMD capabilities, if desired.[45]

Another key difference in the Bush administration strategy from that favored by the Clinton administration is that of long-term relevance. Free of ABM restrictions, the emphasis on integration of multiple platforms better supports long-term evolution, and provides a superior ability to overcome emerging and future threat technological advancements. The use of a variety of options also decreases the ability of U.S. adversaries to defeat a "single point of failure" by providing a mix of capabilities that is also able to defend in depth. The objective end state, a layered missile defense capability, also provides multiple engagement opportunities along the entire flight path of a ballistic missile.

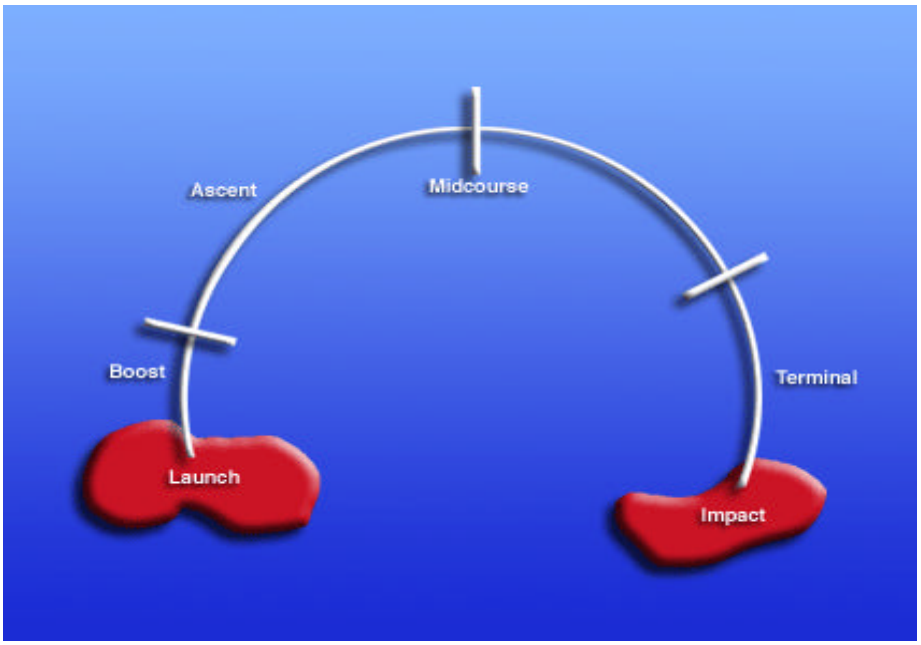

FIGURE 1: BALLISTIC MISSILE TRAJECTORIES[46]

The Bush administration strategy is postured to incrementally develop systems over time that will provide for the employment of complementary sensors and kinetic and directed energy weapons capable of defeating missile threats in the boost, midcourse and terminal phases of flight.[47] Integration of existing land, sea, or air based platforms all present credible initial options, while increased capabilities derived from emerging technologies provide potential for future development and expansion. Since all ballistic missiles share a common, fundamental

element of following a ballistic trajectory, the capability to defend against an attacking missile in each of these phases significantly increases the advantages of defense while it diminishes the potential to exploit a phase-specific capability.[48] This factor is particularly significant in regard to improving the odds of interception and the ability to destroy more lethal payloads, those with CBRNE capability, near its launch point.[49]

TERMINAL PHASE DEFENSE

The terminal phase segment provides defensive capability against ballistic missiles in the terminal phase of their trajectory, or what amounts to the last line of defense, as depicted in Figure 1. Terminal phase systems represent the lower tier programs that are currently available or under development to the military departments.[50] Terminal phase defense alternatives include proven systems like the PATRIOT PAC 3 and GEM capabilities, and the Navy AEGIS air defense system. These systems provide the ability to deploy worldwide, achieve interoperability within an integrated area air defense system, and provide limited ballistic missile defense today against tactical ballistic missiles, anti-radiation missiles, and aircraft.

The most significant limitations of the current terminal phase systems are their inability to effectively defend a large geographic spectrum, like the continental United States. Current terminal phase programs do not demonstrate the intent, or fulfill the administrations resolve to establish a NMD capable of defending the U.S. from ballistic missile attack. Employment and defense designs are also limited to prior intelligence or ambiguous warning to indicate the location of the threat relative to the defended asset. This is compounded by the inability of the PATRIOT system to provide 360-degree coverage, and the sea-borne limitations of the AEGIS (currently possessing only a self-defense capability for the carrier battle group, but identified as a FY 2006 priority of the Cruiser conversion aspect of Navy transformation efforts[51]) to defend adequately over land outside of the littoral.

Primary projects under development to be used in concert with these capabilities and provide the upper tier of the terminal defense segment include the Army's Theater High Altitude Area Defense (THAAD) and Medium Extended Air Defense System (MEADS), which once deployable, will significantly improve integrated air defense capabilities and provide robust, 360-degree protection for critical forward-deployed assets against short- and medium-range ballistic missile threats.[52] THAAD, particularly represents a credible enhancement to existing system capabilities, provides significantly extended surveillance, and the ability to identify and engage incoming missile at ranges of up to several hundred kilometers, far exceeding the current or future capability projections of either PATRIOT or AEGIS. Employing hit to kill technology, the

interception of hostile ballistic missiles would now occur outside or high in the earth's atmosphere[53] decreasing potential effects of CBRNE payloads.

Other significant near term benefits can be achieved in the consideration of these programs. First, integration and employment of upper and lower tier terminal defense systems can provide a greater immediate, even if still limited, defense of specified homeland regions. Strategic employment of these systems in response to increased threat conditions, or intelligence that indicates specific areas at risk would immediately improve current capabilities. Furthermore, the ability to counter existing ballistic missile threats from far greater range, and provide 360-degree surveillance, also provides a significant increase in defense design flexibility, theater deployment options, and defense in depth to counter catastrophic system malfunctions and anomalies. Finally, though other more ambitious programs pose greater challenges in countering potential future emerging theater threats, the technical risk and associated development costs of terminal phase defense is low relative to these systems.[54]

MIDCOURSE PHASE DEFENSE

The midcourse segment provides defensive capability against ballistic missiles in the midcourse phase of their trajectory, or the period between initial ascent and prior to final descent and the terminal phase, as depicted in Figure 1. Multiple elements including the ground-based midcourse systems and sea-based midcourse systems, the successors to the NMD and Navy Theater Wide (NTW) programs are currently developing increasingly promising and robust capabilities to counter ballistic missiles in the midcourse stage of flight.[55] Under the Clinton administration, the NMD program was the only system that had a midcourse intercept capability for defeating ICBMs under development.[56] The significance of the development of a more robust sea-based midcourse system is that integration with the ground-based system can now provide a comprehensive midcourse layer with mobile potential. This development initiative is directly linked to the Bush administration's decision to withdraw from ABM treaty restrictions and pursue more robust, capable, and relevant long-term alternatives.

The ground-based midcourse mission is to intercept incoming ballistic missile warheads *outside* the earth's atmosphere and destroy them by force of the impact.[57] Battle Management, Command, Control, and Communications (BMC3) capabilities enable onboard sensor systems to identify, classify, and process targets for engagement. The addition of midcourse phase defensive capabilities provides a considerable expansion of the potential defended area of operations, clearly enabling a defensive posture in concert with the NMD Act objectives. The increased capability also signals a move forward by the U.S. to stay ahead of the pace of

ballistic missile technology and proliferation. Perhaps most significant however, midcourse employment will mark the departure from "missile defensive capability" of terminal phase systems to the beginnings of a "missile defense umbrella," one that provides continuous protection against the ballistic missile threat. The objective of the Clinton administration was to develop a system that met midcourse homeland defense objectives while conforming to ABM limitations. Through proactive and successful diplomatic negotiations over the utility of ABM treaty, ultimately resulting in rational and tactful withdrawal, the Bush administration is now postured to establish a more robust, integrated, and functional midcourse defensive capability.

BOOST PHASE DEFENSE

As depicted in figure 1, the boost phase segment provides defensive capability against ballistic missiles prior to full ascent, in the boost, or initial phase, of their trajectory. Because the concept of boost phase intercept is designed to destroy ballistic missiles before they are able to deploy submunitions or other countermeasures, this capability provides the only means of destroying hostile missiles in enemy territory other than attack operations.[58] The conduct of attack operations during the Persian Gulf War against mobile Scud tactical erected launchers (TELs) was considered virtually ineffective, resulting in purely defensive operations that defeated TBM's (those within the prioritized area of operations, others outside the defended area were not engaged) in their terminal, and most dangerous stages of flight. The boost phase intercept concept offers numerous advantages. First "the lethality challenge is simplified…because a TBM is a relatively large and vulnerable target – it does not maneuver, and its exhaust plume presents a very high infrared signature"[59] during the boost phase. Second, it is effective in defeating "measures an enemy can adopt in order to counter terminal defenses, including the use of decoys and advanced penetration aids.'[60] By intercepting and defeating the threat before it reaches the terminal phase it reduces the tactical effect of massing missile strikes against a high value asset potentially leading to target saturation of existing terminal phase defense systems like PATRIOT.

Boost phase defense development efforts are currently focused on the potential of space and sea based kinetic energy concepts, and the development of higher power lasers and faster interceptor capabilities that are required to reduce the size of the safe havens available to a hostile state.[61] Though manned aerial laser capabilities has been concluded technically feasible, and could be potentially deployed in the near-term, both the Air Force and Navy determined the number of aircraft required to provide an effective defense to be excessive.[62] The unmanned aerial vehicle (UAV) version is in early stages of development, being

cooperatively developed with Israel, and presents a potential future solution. Sea-based kinetic energy boost phase intercept concepts will be defined and evolve over the next two years using the same booster with a different kill vehicle that will be evaluated for sea-based midcourse roles.[63] Space based laser provides maximum potential but is furthest away in design and development. An Integrated Flight Experiment vehicle is scheduled to be tested in space in 2012, and is based on years of previous development and prudent reduction of technical risk as early as possible in the design process.[64]

U.S. NMD POLICY FEASIBILITY

ASSESSMENT

The Bush administration, through its strong support of NMD, has to some degree already narrowed its policy alternatives. Unless U.S. congressmen act to deny authorization of required appropriations, or technological readiness fails to support implementation, the issue is no longer *if* the U.S. will deploy a NMD system, but rather *when* and *what* type. Therefore, the more relevant question is that of whether the Bush administrations concept of a layered NMD capability is feasible given the competing demands characteristic of the current and future strategic environment. Examination of the interrelated relevant factors of cost, and technological readiness, is useful to provide a feasibility assessment of the Bush administration's NMD policy and future employment concept.

COST

The first factor of consideration is cost. Cost represents perhaps the most contentious factor due to the substantial expense associated with NMD development and employment. This factor is compounded by extensive competing demands for fiscal resources required to fund current ongoing transformation initiatives throughout the services, particularly in the Army, as well as other high cost programs including the F-22 stealth fighter, which, even with the effects of inflation removed, reached an average production cost of $83 million per plane.[65] Air Force officials recently announced in November 2002 a potential cost overrun of up to $690 million in the engineering, manufacturing and development phase of the F/A-22 program and full-rate production costs that will exceed $102 million per unit based on a production rate of 362 aircraft.[66] Additionally the case for NMD funding is further compounded by previous, and considerable sunk investments in a program that is perceived to have yielded few tangible results. The United States spent over $120 billion on missile defense systems from 1957-1999

of which approximately $101.8 billion has been toward ballistic missile defense, including theater level defenses, with the remainder allocated toward other missile defense systems.[67]

Any NMD investment strategy must therefore establish an appropriate level compromise for fiscal resources relative to other compelling homeland security and defense requirements. The trade off in terms of economic feasibility is primarily a function of balancing investment in technology with the need to modernize the force and respond to other aspects of near term readiness. The degree in which fiscal resources are allocated to reduce identified vulnerabilities represents a matter of prioritization. An example of this balance is demonstrated in the recent House decision to pass the final version of the 2003 Defense Authorization Bill in November 2002, which resulted in $7.6 billion provided to missile defense, with the provision to allow the president to shift $814.3 million of those funds for activities to combat terrorism if required.[68] As such, NMD proponents and the administration must continue to reduce the perception of those, both in Congress and the general public, that the high cost of NMD is not justifiable based on an improbable threat. To gain needed consensus, the administration has focused its information campaign effort on increases in ballistic missile proliferation, threat from rogue states and non-state actors, and the rejection of ABM treaty restrictions.

However, relative to cost, the administration has not presented as strong a case despite having considerable merit to their position. The concept of a structured, layered approach is clearly the most appropriate methodology based on the current competing demands for fiscal resources. It fosters increased flexibility, providing potential for employment of a near-term NMD capability to defend the territory of the U.S. while supporting sequential growth over time to address increased threat advancements. Expanding the NMD information campaign to specifically address perceived past and current fiscal inadequacies will be critical to gain congressional and public approval. "Critics of the National Missile Defense system – more limited than President Reagan's ambitious Star Wars failure – say $50 billion has been wasted so far on a plan that may never work because of how difficult – if not impossible – it is to shoot a missile out of the sky."[69] Confidence in NMD development efforts and the pace with which they can be accomplished is directly linked to funding authorizations. Credible argument to address this position exists and must be articulated to counter the notion that previous sunk costs have yielded low return on investment, and therefore should be considered a high-risk investment. More accurately stated, previous sunk costs have postured NMD for success by leveraging years of technological research, development and testing. Failure to pursue these gains to conclusion, especially in light of an environment of increased ballistic missile threat to the U.S. and our allies would represent irresponsible fiscal and defense policy.

TECHNOLOGY

The second factor is technological readiness to produce and field a capable NMD system worthy of significant investment. The Bush administration's commitment to break the stovepipes in Research, Development, Test, and Evaluation (RDT&E), and examine all available technologies and integration potential, are predicated from, and serve to leverage past expenditures as the foundation for positive NMD momentum, rather than dismiss them as failures. Recent technological gains in the areas of sensor arrays, C4I systems, weapons platforms, and laser capability are directly derived from years of previous NMD efforts.

The Bush administration's decision to approach development of missile defense technologies as a single integrated system, that no longer differentiates between, but rather combines and integrates the advancements of former distinct theater and national missile defense programs has decreased redundancy of effort. This initiative has improved technological feasibility in the near and long term by establishing increased coordination, and complimentary development of systems that ultimately will offer options to defeat the threat in all stages of flight. The result is an NMD posture that is more technologically ready, effective, and feasible now than at any previous stage of program. Air Force LTG Ronald Kadish, in November of 2002 indicated a limited missile defense could be achieved within 5 years, stating, "We no longer need to experiment to demonstrate or prevaricate. We need to get on with this and I'm confident that we will."[70] Presently, the absence of a specific action of plan is largely due to the prudent evaluation of options and the coordination of effort. Once an initial option is selected and fielded, the continued authorization of fiscal resources over the course of technological development lifecycles will be essential to sustain the momentum and progress the follow on elements of the administration's layered NMD strategy.

INITIAL NMD EMPLOYMENT PROPOSAL

Despite the Bush administration's desire and commitment to employ an NMD capability as soon as possible, the identification and selection of an initial employment option has yet to be established. The need to concurrently address other compelling national interests, especially those related to the war on terrorism and homeland defense, has established conditions that will require prudent limitations to the initial option. Selection of a limited employment option meets U.S. NMD policy objectives, in a variety of ways. It is consistent with the intent of the NMD Act, rapidly fields a limited capability to defend the continental United States from current ballistic missile threats, maintains the impetus of the administration's NMD initiative by producing tangible results, and finally establishes conditions for future growth and utility. Though it does

not initially produce a full spectrum NMD capability that can protect "the United States, our deployed forces, our friends and our allies," it meets the objective of establishing the foundation for the continued development of increased capabilities that will evolve into the objective end state of a layered missile defense system. Unlike previous administration's employment proposals, ABM treaty compliance restrictions no longer apply, permitting and initial limited approach that would present more robust and attractive potential.

The objectives of limited approach are best achieved through the selection of a midcourse segment capability as its centerpiece. Cost benefits, technological readiness, and rapid fielding potential of a midcourse capability make it a far more feasible and suitable option based on the current strategic environment. Cost savings alone, perhaps the most significant impediment would be in the $200 billion range than a full objective system with boost phase capability. Additionally, because subsequent research and development is not restricted by the ABM treaty, such an approach has the potential to accelerate and go beyond previously projected fielding plans developed by the Clinton administration. Most notably the potential inclusion of complementary assets of sea, air, and land-based capabilities can now achieve limited capabilities with far increased flexibility.

The Navy Midcourse missile defense system provides an excellent example of an initial midcourse capability with increased flexibility. The characteristics of the system permit rapid deployment and significantly reduce U.S. near term missile vulnerabilities while permitting greater flexibility and potential for future growth when combined with space-based assets in the future.[71] MDA requested congressional approval in November 2002 to support a sea-based X-band radar Pacific test bed, stating a sea-based platform would cost less and have great mobility than a land-based system.[72] However the linkage between fiscal 2003 defense appropriations conference report blocks MDA from using BMD funds to buy the sea-based platform until it justifies to Congress why it is superior to the land-based approach which Congress funded under the previous administration.[73] Additionally, this option would be consistent with Pentagon acquisition chief Pete Aldridge's request of the Defense Science Board (DSB) to study how the military can best use sea basing to improve the mobility and flexibility of deployed forces, with a report of the DSB's findings due by June of 2003.[74]

Initial augmentation of a sea-based midcourse option is actually affordable and could be accomplished by enhancing land-based terminal phase options. MDA officials have indicated that with added funding the start of in-flight-testing for THAAD could be moved from the end of 2005 to 2004. Congress recently directed the Pentagon to provide details concerning the THAAD development schedule and life-cycle cost estimates by 15 January 2003 in order to

further assess the program prior to further component testing and initiation of full qualification test program.[75] In the interim existing Patriot PAC 3 systems, which do little to provide defense of U.S. territory but are useful in providing limited defense of deployed forces, recently receiving $507.3 million for procurement of additional missiles to increase theater lower tier capabilities.

Adoption of this proposal would not accelerate boost phase NMD capability efforts, but would neither necessarily be a reason to delay these future programs. Though an ideal NMD would establish a comprehensive system, that included initiation of boost phase capability, it is clearly not a practical or feasible initial option. Substantive further development of these technologies would be required and cause significant fielding delays that would continue to expose missile defense vulnerabilities. Cost and funding issues alone would clearly cause a significant delay in implementation, and would likely fall victim to the pitfalls of being overcome by competing resource constraints. Additionally, attempts to rapidly develop a more comprehensive missile defense capability would not only require a substantive up front investment, but more importantly, would yield results based on today's technology. This strategy would risk employing capabilities being superseded by emerging weapons technology before they are able to realize potential benefit.

Delaying implementation of the boost phase component could however serve a positive effect in the maturation of the layered approach to NMD. First, since success is dependent on emerging technological concepts, rushing to implement invites considerable risk of failure and could damage long-term implementation efforts. Implementation of an objective NMD component system, capable of engaging threat ballistic missiles in all stages of flight, and that makes full use of all emerging technological advancements, is clearly not a practical initial option.

Second, fielding a limited option provides additional time to obtain broader international support and acceptance of a more comprehensive NMD capability prior to implementation. Despite dynamic changes to the strategic environment, much concern still exists of a comprehensive NMD capability being a threat to the global balance of power. A layered employment approach will reduce concerns of potential U.S. hegemony by the demonstration of beneficial results. A NMD system with a complete array of capabilities and strategic utility would also require the sustainment of the current administrations political attitudes. Though the Bush administration currently enjoys a majority in both chambers of Congress, a shift in balance could easily defeat continued advancement of NMD initiatives.

CONCLUSION

The U.S. government has clearly reached, and ventured beyond the point where failure to field an NMD capability has created an inviting vulnerability to U.S. adversaries worldwide. The threat to U.S. territory can no longer be characterized as a distinct possibility, but rather represents an exposed liability that has now become a question of *when* not *if* the U.S. will be subjected to a missile attack. The conclusions of the Rumsfeld Commission in 1998, that the ballistic missile threat was real, growing, and that new threats would continue to appear with little advanced warning, have proven accurate. This fact is further supported by the demonstration of resolve, planning capability, and resourcefulness during the attacks of September 11, 2001. The threat of terrorist groups and rogue states attacking U.S. vulnerabilities in an effort to demonstrate their ability to render consequence to U.S. policy that is adverse to their political objectives and influence, has become a primary 21st century security concern.

In light of significant changes to the strategic environment, especially those regarding homeland defense, the need to field a NMD capability that, at a minimum, achieves the objectives of the NMD Act of 1999 is greater now than ever before. Recognition by U.S. and Russian leadership that the war on terrorism required increased levels of cooperation and partnership that supersedes the past utility of ABM restrictions was an essential response to the changing environment. Withdrawal from the restrictions of the Cold War era ABM treaty has postured the U.S. to deploy a limited NMD capability that would achieve these objectives without the high cost associated to a land based system of lesser effectiveness. Additionally, the United States has demonstrated the technological readiness to achieve a limited initial NMD capability that would address ballistic missile vulnerabilities within fiscal boundaries required to establish other vital homeland defense initiatives.

A comprehensive homeland defense strategy that cannot defend U.S. territory, population, and interests from potential attack or blackmail of missile attack is clearly flawed. This issue is only compounded by the concurrent proliferation CBRNE threats. If not addressed the U.S. will government will continue to encourage, not discourage, ballistic missile proliferation and increased offensive missile technology development. Baker Smith, of the Heritage Foundation perhaps captured this best when he stated:

> Deploying a missile defense system to protect Americans is more likely to make countries like North Korea weaken their commitment to their missile programs, because they will become less likely to inflict damage on the United States yet too costly to maintain. Since vulnerability all but guarantees the effectiveness of their missiles, deploying missile defenses to close the vulnerability gap would remove the incentive to develop a missile strike capability against the United

> States. As the following discussion shows, recycling old Cold War myths about arms control and missile defense will only undermine America's ability to develop and deploy a capable system to defend itself from attack.[76]-
>
> —Baker Smith
> The Heritage Foundation

If it is the fundamental responsibility of the U.S. government to provide for the defense of its people, then deploying an NMD system before existing missile defense vulnerabilities are exploited is imperative. The evolving strategic environment, specifically increased threats to U.S. homeland security, infers that further delays to implementation are no longer an acceptable risk. U.S. policymakers are at a decision point, one that the American public and ultimately history will hold them responsible and accountable for their actions. The American people will not accept a catastrophic ballistic missile attack on their soil with 9/11 results, especially if the means to defend against it were available but not utilized.

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GLOSSARY

ABM	Anti-Ballistic Missile
BMC3	Battle Management, Command, Control, and Communications
BMD	Ballistic Missile Defense
CBRNE	Chemical, Biological, Radiological, Nuclear, and Enhanced high explosive
C4I	Command, Control, Communications, Computers, and Intelligence
DoD	Department of Defense
DSB	Defense Science Board
FAS	Federation of American Scientists
GEM	Guidance Enhanced Missile
ICBM	Intercontinental Ballistic Missile
IFT	Integrated Flight Test
MDA	Missile Defense Agency
MEADS	Medium Extended Air Defense System
NMD	National Missile Defense
NTW	Navy Theater Wide
QDR	Quadrennial Defense Review
RDT&E	Research, Development, Test, and Evaluation
SALT	Strategic Arms Limitations Talks
SLBM	Submarine Launched Ballistic Missile
TBM	Tactical Ballistic Missile
TD-2	Taepo Dong 2 ballistic missile
TEL	Tactical Erected Launcher
THAAD	Theater High Altitude Area Defense
UAV	Unmanned Aerial Vehicle
U.N.	United Nations
U.S.	United States
USAWC	United States Army War College
WMD	Weapons of Mass Destruction
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